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### **3. WATER QUALITY IMPROVEMENT STRATEGIES, NON-ECP BASINS**

This revised Part 3 defines strategies and approaches for water quality improvement in discharges from the Non-Everglades Constructions Project (Non-ECP) Basins (formerly know as the Everglades Stormwater Program Basins) recommended for completion to supplement those strategies that are already part of the Long-Term Plan. The Non-ECP basins are those basins discharging to the Everglades Protection Area (EPA) but which are not part of the Everglades Construction Project (ECP). A combination of phosphorus source controls, local government and private water control and conservation programs, and integration with Comprehensive Everglades Restoration Plan (CERP) projects form the foundation for water quality improvements in the Non-ECP Basins. As in the ECP Basins, it should be anticipated that further refinements to the projects and activities recommended herein would be made as more scientific and engineering information is obtained. Projections of the potential impact of the strategies recommended herein on phosphorus discharges to the EPA are discussed in Part 4 of this Long-Term Plan.

As noted in Part 1, there remains uncertainty concerning the efficacy of some of the recommended improvements and strategies. It is for those reasons that the Process Development and Engineering (PDE) actions recommended in Part 5 continue through 2016. If, as a result of future performance data and forecasts, it is found necessary to take additional actions to provide adequate assurance of an ability to meet the planning objectives, those actions will be based on the findings and conclusions of the PDE effort. Those future steps would include identification and adaptive implementation of additional water quality improvement measures that may then be considered necessary to meet the planning objective. Those steps would be finally defined and implemented in accordance with the overall strategy outlined in Part 6 of this Long-Term Plan.

The Non-ECP Basins include a total of seven basins; five of those basins are addressed in this Part 3 and are listed in **Table 3-1**; the overall boundaries of those basins are shown in **Figure 3-1**.



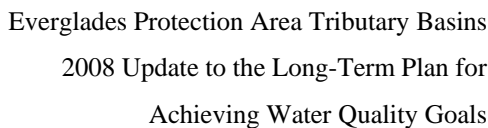
**Table 3-1. Non-ECP Basins Included in Long-Term Plan.**

<b>Hydrologic Basin</b>
North Springs Improvement District
North New River Canal
C-11 West
L-28
Feeder Canal

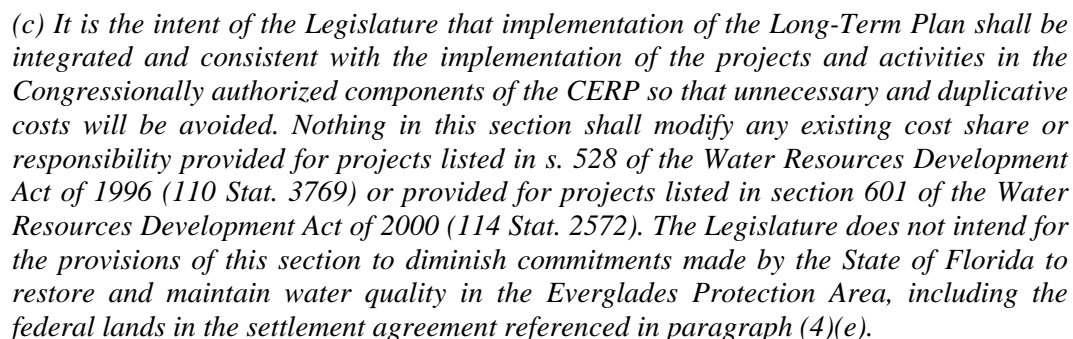
Since the publication of the 2003 Long-Term Plan, Acme Basin B has been removed from the Non-ECP Basins. Runoff from Acme Basin B was previously directed to WCA-1. However, as part of Revision 4 to the Long-Term Plan<sup>1</sup>, diversion facilities were constructed, such that discharges to WCA-1 were terminated in December 2006. Runoff from Acme Basin B is now directed to the C-51 Canal for treatment in STA-1E. The two remaining basins of the Non-ECP Basins, the C-111 Basin and the Boynton Farms Basin, are being addressed by other District and Federal programs. Each of the Non-ECP basins is scheduled to receive one or more projects under CERP. In general, the recommended strategy in the Non-ECP basins is to rely upon phosphorus source controls and full integration with CERP to achieve water quality standards and the improvement goals of the Everglades Forever Act, to the extent that this is consistent with state and federal authorization, and will require close coordination with the CERP process. Additional guidance for implementation of the recommended strategy was provided by the Florida Legislature in its 2003 amendment of the Everglades Forever Act (373.4592 F.S.), which states:

*(c) It is the intent of the Legislature that implementation of the Long-Term Plan shall be integrated and consistent with the implementation of the projects and activities in the Congressionally authorized components of the CERP so that unnecessary and duplicative costs will be avoided. Nothing in this section shall modify any existing cost share or responsibility provided for projects listed in s. 528 of the Water Resources Development Act of 1996 (110 Stat. 3769) or provided for projects listed in section 601 of the Water Resources Development Act of 2000 (114 Stat. 2572). The Legislature does not intend for the provisions of this section to diminish commitments made by the State of Florida to restore and maintain water quality in the Everglades Protection Area, including the federal lands in the settlement agreement referenced in paragraph (4)(e).*

<sup>1</sup> Copies of all Revisions to the Long-Term Plan are available at the District's Long-Term Plan website. A summary of all revisions is contained in Appendix A.



Note: With the diversion of its runoff to C-51W, Acme Basin B is now an ECP Basin.





It is intended that the stormwater treatment areas and other works recommended herein be operated to maximize the amount of water treated; e.g., no bypass of the treatment areas should be permitted except under extreme circumstances in which the hydraulic capacity of the works is exceeded, or unless the duration of sustained inundation creates conditions threatening the survival of marsh vegetation and the treatment efficiency of the project, or when water supply needs require it. It is further intended that the operation of the treatment works not negatively impact flood protection. Ancillary uses of the treatment areas for purposes other than water quality improvement will be limited to those that do not negatively impact treatment performance.

The recommendations contained herein are based on analyses contained in a series of Technical Memoranda prepared for the South Florida Water Management District by CH2M Hill and Gary Goforth, Inc.:

- Draft Deliverable 3.1.1: Technical Memorandum - Water Quality Performance Evaluation of the Pre-2006 Projects, April 18, 2008.
- Draft Deliverable 3.2.1: Technical Memorandum – Evaluation of Analytical Tools, March 5, 2008.
- Draft Deliverable 3.3.1: Technical Memorandum – Updated Basin Data, March 27, 2008.
- Draft Deliverable 3.4.1: Technical Memorandum – Potential Supplemental Water Quality Improvement Measures, July 22, 2008.

Copies of these Technical Memoranda are available at the District's Long-Term Plan website:

[https://my.sfwmd.gov/portal/page?\\_pageid=2294,4946718,2294\\_4946541:2294\\_4946389&\\_dad=portal&\\_schema=PORTAL](https://my.sfwmd.gov/portal/page?_pageid=2294,4946718,2294_4946541:2294_4946389&_dad=portal&_schema=PORTAL)



### **3.1. North Springs Improvement District**

The NSID Basin covers an area of approximately 7,400 acres (11 square miles) in northern Broward County. The basin is bounded on the north by the Palm Beach County line and on the west by the L-36 North Borrow Canal and Water Conservation Area (WCA) 2A. The Sawgrass Expressway (Florida Highway 869) runs in an east-west direction through the basin, turning south along the basin's western border as it approaches WCA-2A. The City of Coral Springs comprises much of the southern half of the basin. The City of Parkland comprises much of the northern half of the basin. A map illustrating the boundaries of the NSID Basin is presented in **Figure 3-2**.

Land use in the NSID Basin consists primarily of urban residential development. Most of the land in the southern half of the basin is heavily developed with residential subdivisions. The northern portion of the basin is currently in the process of being converted from agricultural to urban land use as new residential development continues. It is expected that over the next 5 years, most of the remaining undeveloped agricultural land in the basin will be developed into urban residential land use.

Drainage from the NSID Basin is managed in a network of interconnected lakes and canals that are operated by the NSID to provide flood protection throughout the basin. Two pumping stations, NSID Pump Station No. 1 and NSID Pump Station No. 2, are used to discharge stormwater north through the L-36 North Borrow Canal (L-36N) and then into the Hillsboro Canal through a series of culverts (S-39A). The Hillsboro Canal conveys stormwater to the east, eventually discharging excess flow to tide. However, when the L-36N Canal and the Hillsboro Canal are not capable of accepting additional flow, water from the NSID Basin is discharged into WCA-2A through NSID Pump Station No. 1. The primary phosphorus reduction strategy for the NSID is to minimize pumping to the WCA. Starting in WY2001, operation of the NSID pumping station 1 (NSID1) structure has adhered to the operational criteria set forth in the NSID Environmental Resource Permit (ERP). The ERP requires that flows be pumped from the NSID1 structure to the WCA-2A only when the NSID basin stage reaches a certain elevation or when capacity is not available in the Hillsboro Canal to discharge to tide. The discharge flow volumes

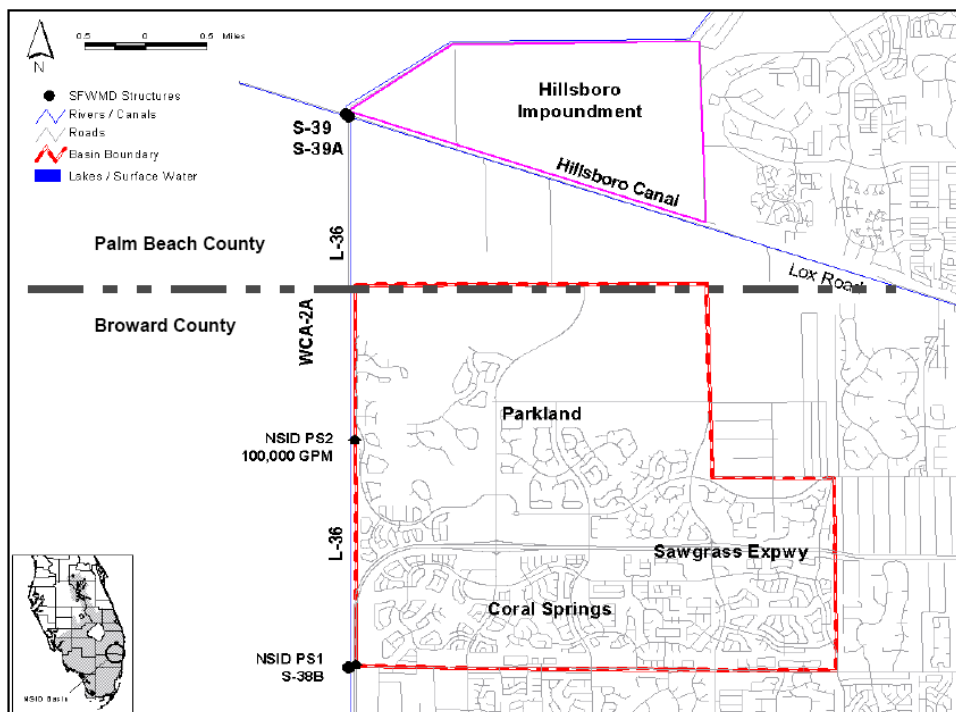


at the NSID1 structure to WCA-2A have been significantly reduced since WY2001, when compared to previous water years. Also, while the land use in the northern sections of the basin has changed from agricultural to residential land use in the last few years, TP concentrations have dropped significantly, from a flow-weighted mean of 48 ppb for WY1995-WY2000 to 18 ppb for the one event that occurred during the period WY2001-2008.

It should be noted that the NSID1 structure is not under the control of the District and therefore it is not included in the set of structures that fall under the District's permitting requirement of the Everglades Forever Act (Ch. 373.4592(9)(k)). However, the District is utilizing its ERP program to effect implementation of phosphorus source controls in the NSID Basin to ensure discharges from this basin into WCA-2A are in compliance with established water quality standards.

**Figure 3-2. North Springs Improvement District Basin Map.**

(Source Brown & Caldwell 2002)



As recommended by the 2003 Long-Term Plan, the District assisted Broward County in coordinating a county-wide working group to develop a comprehensive pollution prevention plan





with specific water quality goals and milestones. NSID Basin stakeholders have participated in this working group and the ERP process will require the development of a comprehensive pollution prevention plan for this basin.

The January 3, 2007, Long-Term Plan Revision provided additional source control funding through Fiscal Year 2010 for this basin. The District has been using these funds for educational activities to ensure awareness and proper implementation of pollutant source control practices and to provide public outreach in partnership with Broward County.

A large water impoundment is being planned on the north side of the Hillsboro Canal, just north of the NSID Basin, as part of Component M, Part 1, of the Comprehensive Everglades Restoration Plan (CERP). The Fran Reich Preserve CERP Project (formerly known as the Hillsboro Site 1 Impoundment CERP Project) will supplement water deliveries to the Hillsboro Canal during dry periods, thereby reducing demands on Lake Okeechobee and the Loxahatchee National Wildlife Refuge. Water from the Hillsboro Canal will be pumped into the reservoir during the wet season or periods when excess water is available and be released back to the Hillsboro Canal to help maintain canal stages during the dry-season. The 2003 Long-Term Plan assumed this project was to be completed by CERP by December 2007, and the January 3, 2007, Long-Term Plan Revision modified the completion date projection to December 2009, however the current schedule for completion under the CERP Program is July 2012. The relationship of the North Springs Improvement District to the Fran Reich Preserve CERP Project is defined in the following excerpt from the 2003 Long-Term Plan document:

*“This separable element includes canal and structure relocations, canal conveyance improvements, water control structures and an aboveground impoundment with a total storage capacity of approximately 13,500 acre-feet located in the Hillsboro Canal Basin in southern Palm Beach County. The design of the impoundment included one compartment totaling 1,600 acres with water levels fluctuating up to eight feet above grade. The S-39A structure will be replaced and redesignated as S-527B. North Springs Improvement District flows were redirected from Water Conservation Area (WCA) 3 into the Hillsboro Canal and then to the impoundment. The conveyance capacity of the Hillsboro Canal will be*



*increased from the impoundment inflow structure east to the Lake Worth Drainage District E-1 canal to allow backpumping of additional flows from the western Hillsboro Canal basin.”*

More detailed planning and design of the Fran Reich Preserve CERP Project is included in the overall scope of the October 2001 *Central and Southern Florida Project, Water Preserve Areas, Draft Integrated Feasibility Report, Supplemental Environmental Impact Statement*. Updates on status and details of this project are available at the CERP web site ([www.evergladesplan.org](http://www.evergladesplan.org)) and Acceler8 web site ([www.evergladesnow.org](http://www.evergladesnow.org)).

As recommended by the 2003 Long-Term Plan, the District hired a consultant to perform a hydraulic evaluation of storm events in the basin to determine if there would be any negative impacts from redirecting water currently discharged to WCA-2A to the Hillsboro Canal east of S-39. This evaluation was completed in July 2004. In formulating the assumptions for the evaluation, it was determined through coordination with the CERP PDT that the Fran Reich Preserve CERP Project's design does not include impoundment storage capacity reserved for storm event flows from NSID, and therefore cannot be depended on for flood protection purposes. The hydraulic/hydrologic evaluation, based on a single event analysis, therefore excluded flow into the impoundment and predicted the water elevations in the Hillsboro Canal would increase under these circumstances during large storm events.

The District performed further analysis through a second consultant contract to evaluate potential mitigation measures and to estimate the 50-year present value cost associated with such alternatives. This evaluation, completed in October 2005, estimated conceptual costs in 2006 dollars for improvements for conveyance to the canals and the G-56 tidal structure at almost \$17 million. Alternatively, costs for an impoundment site were estimated to be between \$57 million and \$133 million depending largely on land acquisition costs.

The expenditure for these mitigation measures is considered to be infeasible and impractical considering the relatively small TP load estimated to be diverted from the EPA. During a large



storm event, the existing NSID system may be required to discharge to the EPA to avoid flooding impacts in the Hillsboro Canal basin. The District has therefore evaluated the potential TP loads that could be expected to enter the EPA during large storm events. Based on recent TP concentration data, specifically Water Year (WY) 2001-WY2005, during flow events and flow data from a recent South Florida Water Management Model (SFWMM) simulation, the average annual TP load to the EPA from NSID is estimated at 7 kg. This load is significantly less than the estimation from the 2002 Basin Specific Feasibility Studies (BSFS), which calculated annual loads of 293 kg based on a TP concentration of 39 ppb. The previous estimates used for 2003 Long-Term Plan recommendations are no longer valid due to improved water quality and revised operational criteria for NSID, which includes coordination with SFWMD operations staff to monitor stages downstream in the Hillsboro Canal. It should be noted that since discharge would be based on extreme storm conditions that are not anticipated every year, individual annual stormwater discharge volumes are expected to range from 0 to approximately 3,800 acre-ft with an average of 305 acre-ft.

Despite the inability to depend entirely on the Fran Reich Preserve CERP Project for protection during large storm events, completion of the project should further reduce discharges from NSID to the EPA. Operation of the impoundment's intake pumps during large storm events, when the impoundment has storage capability, will effectively increase the capacity of the Hillsboro Canal for NSID discharges.

### ***3.1.1. Recommended Water Quality Improvement Strategy***

The following water quality improvement measures are being implemented for the NSID Basin:

- Continue funding through Fiscal Year 2010 for the implementation of source controls;
- Implement phosphorus source controls through the regulatory programs, including maintaining ERP-required effective operational strategies at the NSID pumping stations; and



- Diversion of NSID discharges (formerly directed to WCA-2A) to the Fran Reich Preserve CERP Project (formerly known as the Hillsboro Site 1 Impoundment CERP Project) is currently scheduled for completion under the CERP Program in July 2012.

No new measures are recommended for the NSID Basin at this time.

### **3.1.2. Estimated Costs**

The January 2007 revision to the Long-Term Plan extended the funding for the Broward County Source Controls Project, including the NSID Basin, through FY 2010. A total of \$230,000 has been allocated for the NSID, North New River Canal (NNRC), and C-11 West basins for FY 2009 and FY 2010. These funds will be used primarily to continue implementation, in partnership with Broward County, of public outreach and education activities in said basins.



### **3.2. North New River Canal Basin**

The North New River Canal Basin (NNRC Basin) covers an area of approximately 19,000 acres (30 square miles) in eastern Broward County. The basin is located southeast of WCA-2B, west of the Florida Turnpike and north of Interstate 595. The NNRC Basin is located immediately to the north of the C-11 West Basin, separated from that basin by the North New River Canal which runs generally east-west along the southern boundary of the NNRC Basin. A map of the NNRC Basin is presented in **Figure 3-3**.

Land use in the NNRC Basin is almost entirely urban residential and commercial development. Portions of the Cities of Sunrise and Plantation comprise the area of the basin north of the North New River Canal. Bonaventure, a densely developed commercial and residential area, makes up the small area located south of the North New River Canal. Small amounts of agricultural and undeveloped land still exist, but land values in the basin continue to rise as development continues. The G-123 structure, located at SR 27 and I-595, discharges water from this basin to WCA-3A. This structure is mainly used for water supply to WCA-3A and is not intended to be used for flood control. However, during large storm events, when storage is available in the water conservation areas, G-123 may be turned on to provide some relief. This basin is primarily served by the G-54 structure located just west of the turnpike, which discharges to tide.

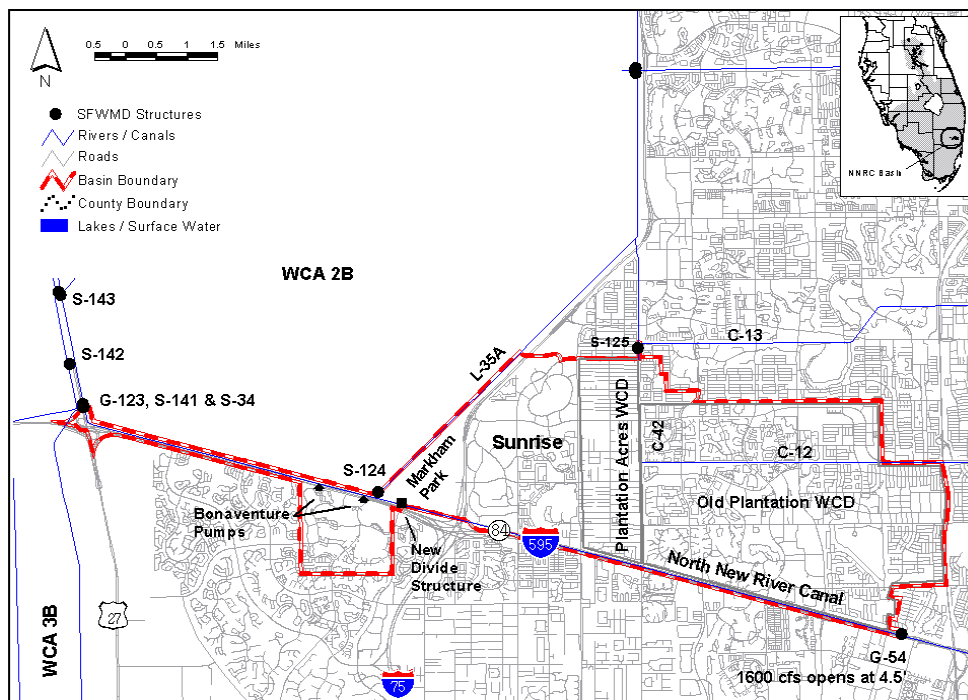
A CERP Project (WCA 2 and WCA 3 Diversion Project [CERP Component YY4]) will impact future management of surface water flows from the NNRC Basin. The 2003 Long-Term Plan assumed this project was to be completed by 2018; however, the January 3, 2007, Long-Term Plan Revision modified the completion date projection to the 2020-2025 period (CERP Band 4). The WCA 2 and WCA 3 Diversion Project includes the construction of a new basin divide structure across the North New River Canal at Markham Park. The CERP project also will include canals to reroute urban runoff from the Bonaventure pump stations to the North New River Canal downstream (east) of the new divide structure. The new divide structure will effectively eliminate urban runoff from the NNRC Basin from discharging to the EPA. Seepage from WCA 2B that is collected in the L-35 Borrow Canal will be redirected into new canals



which will convey it south to the Everglades National Park. After the CERP project is completed in 2020-2025 period, all flows to WCA 3A through the G-123 pump station will be eliminated.

**Figure 3.3 North New River Canal Basin Map.**

(from Brown & Caldwell 2002)



As recommended by the 2003 Long-Term Plan, the District assisted Broward County in coordinating a county-wide working group to develop a comprehensive pollution prevention plan with specific water quality goals and milestones. NNRC Basin stakeholders have participated in this working group. The District has worked cooperatively with all local water control districts in this basin to implement operational changes that either reduce their discharges or provide additional water quality treatment prior to discharge. In addition, the District and Broward County have implemented public outreach and education activities in this basin targeting pollutant reduction at the source.



The January 3, 2007, Long-Term Plan Revision provided additional source control funding, through Fiscal Year 2010, for this basin. The District has been using these funds for educational activities to ensure awareness and proper implementation of pollutant source control practices and to provide public outreach in partnership with Broward County. This Long-Term Plan Revision also recommended to include in ERP requirements the implementation of appropriate source control programs (i.e., Best Management Practices or BMPs) to achieve water quality goals.

The January 3, 2007, Long-Term Plan Revision also included revision of the strategy for this basin. The strategy approved by FDEP in Revision 6 to the Long-Term Plan for the North New River Canal (NNRC) Basin was to discontinue the use of G-123, other than as may be absolutely necessary for water supply or flood protection emergencies, until completion of the WCA-2 and WCA-3 Diversion CERP Project. The revised operating strategy has been highly effective, with only one year of discharge since WY2003, resulting in a decrease in the average annual TP load from 375 kg/yr for WY1995-WY2002 to 8 kg/yr for WY2003-WY2008.

### **3.2.1. Recommended Water Quality Improvements Strategy**

The following water quality improvement measures are being implemented for the NNRC Basin:

- Continue funding through Fiscal Year 2010 for the implementation of source controls;
- Continue implementation of source controls through regulatory programs (i.e., BMPs) to achieve water quality goals; and
- Discontinue the use of G-123 after December 31, 2006, other than as may be absolutely necessary for water supply emergencies or emergency flood protection within the basin (WCA-2 and WCA-3 Diversion CERP Project completion assumed by 2020-2025)

No new measures are recommended for the NNRC Basin at this time.



### **3.2.2. *Estimated Costs***

The January 2007 revision to the Long-Term Plan extended the funding for the Broward County Source Controls Project, including the NNRC Basin, through FY 2010. A total of \$230,000 has been allocated for the NSID, North New River Canal (NNRC), and C-11 West basins for FY 2009 and FY 2010. These funds will be used primarily to continue implementation, in partnership with Broward County, of public outreach and education activities in said basins.





### **3.3. C-11 West Basin**

The C-11 West Basin covers an area of approximately 46,000 acres (72 square miles) in south-central Broward County. Current water management activities in the basin provide flood protection, drainage, water supply, protection from saltwater intrusion and seepage collection from WCA-3A. The four primary canals in the basin are the C-11 West, the C-11 South, the L-37 Borrow Canal, and the section of the L-33 Borrow Canal between the C-11 West Canal and Pines Boulevard. A map of the C-11 West Basin is presented in **Figure 3-4**.

Currently, stormwater runoff from the C-11 West Basin is pumped into WCA-3A through the District's S-9 pump station. Seepage flows from WCA-3A are also returned through the S-9 pump station. Pump Station 9A (S-9A) is directly adjacent to S-9. The purpose of S-9A is to improve the quality and timing of stormwater discharge from the Western C-11 basin into WCA 3A by back pumping seepage lost from WCA 3A back into WCA 3A at the same approximate rate it enters the canal. The use of S-9A reduces the operational dependency placed on the larger pumping units of S-9. The structure is remotely operated to maintain optimum headwater stages in the C-11 Canal. The S-9A pump structure became operational in early 2003, and a divide structure (S-381) was completed in early 2005 (C-11 West Critical Project). This construction project changed the operation of the water management system by separating and returning seepage water with less phosphorus to WCA-3A, thereby decreasing the pumping frequency at the larger S-9 structure. Gated culvert structure 13A (S-13A), located at the east end of the C-11 West canal (or about 10 miles east of S-9) operates as a basin divide structure and assists in maintaining optimum water control stages in the C-11 Canal and passes dry season releases to the area east of the structure (i.e., C-11 East Basin, which drains to tide). There has been extensive water quality monitoring at the original S-9 pump station, the primary discharge structure from the C-11 West Basin. As part of a Critical Restoration Project, the S-9A pump station was constructed to minimize the magnitude and frequency of pumping at the S-9 station. The S-9A pump station discharges mostly seepage return and groundwater into WCA-3A; however, the pumps are occasionally used during small storm events. Spillway structure S-381 is an Obermeyer gated structure that acts as a canal divide to separate the urban area east of the



structure from the mainly natural area located to the west. Construction of S-381 is complete and the structure is currently in operation. During the limited period since the Critical Restoration Project was initiated, flows TP loads and TP concentrations in discharges to from the S-9 and S-9A structures (also known as the S-9 Complex) WCA-3A have been reduced, as shown in the table below.



**Figure 3-4. Southwest Broward County C-9 and C-11 Impoundments.**



**Table 3-2. Comparison of Discharges from the S-9 Complex.**

Time Period	Volume ac-ft	TP Load kg	TP Conc ppb
WY1995-2003	251,982	5,525	17.8
WY2004-2008	172,272	3,493	16.4
<i>Differences</i>	<i>-79,710</i>	<i>-2,031</i>	<i>-1.3</i>

The C-9 Canal divides Broward County from Miami-Dade County and includes part of Snake Creek Canal, which now extends from a point in the Everglades northwest of Miami to an outlet in Oleta River in North Miami Beach. The C-9 Canal drains a 40 square-mile area in northern Dade County and southern Broward County. It drains into Biscayne Bay through the Oleta River. Pump Station S-29, located along Snake Creek Canal about 375 feet downstream of US 1, is used to control over-draining of the area, and to prevent direct saltwater intrusion into Snake Creek. Approximately 90-95 percent of the drainage is discharged through S-29, while approximately 5-10 percent is directed south to Miami Canal through Culvert 30 (S-30), Levee Canal 33 (L-33), and Culvert 32 (S-32).

As recommended by the 2003 Long-Term Plan, the District assisted Broward County in coordinating a county-wide working group to develop a comprehensive pollution prevention plan with specific water quality goals and milestones. This working group developed a document titled “*Broward County C-11 West Basin Pollution Reduction Action Plan*” in April 2006 ([https://my.sfwmd.gov/pls/portal/docs/PAGE/PG\\_GRP\\_SFWMD\\_WATERSHED/SUBTABS\\_S\\_TAMANAGEMENT\\_LONGTERMPLAN/TAB1834097/C-11APRIL\\_06\\_V2\\_WAPPENDIX.PDF](https://my.sfwmd.gov/pls/portal/docs/PAGE/PG_GRP_SFWMD_WATERSHED/SUBTABS_S_TAMANAGEMENT_LONGTERMPLAN/TAB1834097/C-11APRIL_06_V2_WAPPENDIX.PDF)). The District will assist Broward County and all stakeholders in the implementation of the action plan for the C-11 West Basin.

Revision 6 to the Long-Term Plan, dated January 3, 2007, provided additional source control funding, through Fiscal Year 2010, for this basin. The District has been using these funds for educational activities to ensure awareness and proper implementation of pollutant source control practices and to provide public outreach in partnership with Broward County. This Long-Term



Plan Revision also recommended to include in ERP requirements the implementation of appropriate source control programs (i.e., BMPs) to achieve water quality goals.

One of the key assumptions during the development of the October 2003 Long-Term Plan was that the strategy for the C-11 West Basin, as well as determination of its implementation schedule, would be accomplished through the CERP planning process. Revision 5 to the Long-Term Plan (dated July 28, 2006) incorporated the C-11 and C-9 Impoundments into the Long-Term Plan. Revision 6 to the Long-Term Plan, dated January 3, 2007, revised the CERP project completion schedule January 2006 to December 2009. The purpose of the C-9 and C-11 Impoundments is to moderate the harmful effect of excess nutrients on Everglades marshes by capturing and storing the excess water from the C-11 Canal basin. This will be accomplished by diverting stormwater runoff from the Western C-11 Basin to the C-11 Impoundment and then to the C-9 Impoundment through a diversion canal west of US Highway 27 prior to off-peak draw down to Snake Creek, an estuary in north Biscayne Bay. Descriptions of these projects are provided below.

**C-11 Impoundment.** The C-11 Impoundment consists of an above-ground impoundment with a total storage capacity of approximately 5,960 acre-feet located in the C-11 Canal Basin in western Broward County. Major elements of this feature include canals, levees, water control structures, and buffer marsh areas. Water control structures consist of pump stations, a gated spillway, gated and non-gated culverts, and a non-gated fixed weir. The design of the impoundment includes two compartments totaling 1,695 acres with water levels fluctuating up to 4 feet above grade in the 1,490-acre compartment and can provide emergency storage of up to 2 feet in the 205-acre wetland marsh buffer area. Permitted mitigation within the 1,490-acre compartment footprint will be relocated to the new wetland marsh buffer. The C-11 Impoundment features will direct runoff events from the Western C-11 drainage basin into the impoundment instead of pumping the untreated runoff into WCA 3A through the S-9 pump station. The impoundment pool will also assist in reducing seepage from WCA 3A thereby increasing groundwater recharge in the vicinity of the impoundment, and provide an additional source of water for meeting the municipal and agricultural water supply demands and for preventing saltwater intrusion into drinking water



aquifers. Water will be released from the impoundment to the C-11 Canal to help maintain canal stages during the dry season, recharge south Broward County well-fields, improve groundwater elevations in the eastern C-11 basin and to maintain water levels in Pond Apple Slough. Seepage from the impoundment will be collected and returned to the impoundment.

**C-9 Impoundment.** The C-9 Impoundment consists of an aboveground impoundment with a total storage capacity of approximately 6,600 acre-feet located in the Western C-9 Basin in Broward County. Major elements of this feature include canals, levees, and water control structures. The impoundment area totals 1,739 acres with water levels fluctuating up to 4 feet above grade in the 1,650 acre compartment. The C-9 STA/Impoundment features will collect and provide additional storage for runoff diverted from the Western C-11 basin and along with storing runoff from the Western C-9 Canal basin. C-11 basin runoff will be directed to the C-9 Impoundment via the C-502B Borrow Canal which traverses the WCA 3A/3B Seepage Management Area feature. The impoundment pool will assist in reducing seepage from WCA 3B, thereby increasing groundwater recharge in the vicinity of the impoundment, and provide an additional source of water for meeting the municipal and agricultural water supply demands and for preventing saltwater intrusion into drinking water aquifers. Water will be released from the impoundment to the C-9 Canal to help maintain canal stages during the dry season, recharge south Broward County well-fields, and improve groundwater elevations in the C-9 basin. Seepage from the impoundment will be collected and returned to the impoundment.

As of June 2007, the U.S. Army Corps of Engineers assumed the responsibility for the completion of design and construction of the C-9 and C-11 CERP projects. The diverting of Western C-11 Basin runoff to the C-11 and C-9 Impoundments requires numerous infrastructure additions and changes within the Central and South Florida Flood Control Project's system.

- Construction of the C-11 Impoundment on the north bank of the Western C-11 Canal along with associated inflow pump station, normal and emergency discharge structures, seepage collection system
- Increase the conveyance capacity of the an existing DOT drainage ditch into the C-502B Canal for diversion of Western C-11 basin stormwater runoff



- Construction of the C-9 Impoundment on the north bank of the Western C-9 Canal along with associated inflow pump station, normal and emergency discharge structures, seepage collection system
- Construction of a divide structure in the C-9 Canal, S-511

The project will pump stormwater runoff from the Western C-11 Basin into an above ground impoundment adjacent to the C-11 Canal where it will be stored and directed south through the C-502B to the C-9 Impoundment. The impoundment will regain storage capacity through seepage and evaporation losses as well as off-peak release to the C-9 and C-11 East Canals. Deliveries to the C-9 Canal assist in meeting salinity envelope targets in Snake Creek, downstream of the C-9 Canal's salinity control structure (S-29). Diversion of this stormwater from WCA 3A will reduce nutrient loading to the EPA. Through the detention of the stormwater in the impoundments, albeit of short duration, some water quality treatment will occur so releases recharging the canal systems will be of higher quality. Also a reduction of seepage losses from the WCA 3A will occur due to higher groundwater stages immediately east of the WCA 3A at the impoundment locations. Stormwater of the Western C-11 basin that can not be diverted to the C-11 or C-9 Impoundments or to the C-11 East or the C-9 Canals without impacting the existing level of flood protection will continue to be pumped to WCA 3A through the S-9 Pump Station.

The project design is based on the *Comprehensive Review Study of the Central and South Florida Flood Control Project* 1999; the *draft Water Preserve Area Feasibility Study*, October 2001; the *draft Broward County Water Preserve Area Project Implementation Report*, November 2005; *Flood Protection Analysis for the Broward County Water Preserve Areas C-11 and C-9 Impoundments* by Burns & McDonnell in February 2006; *Evaluation of Stormwater Treatment Potential of the Western C-11 Impoundment* by Mactec March 2004; *Basin Specific Feasibility Studies, Everglades Stormwater Program Basins* and the Burns & McDonnell in the October 23, 2002 *Evaluation of Alternatives for the ECP Basins*.



In addition, the North Lake Belt Storage CERP Project, scheduled for completion in June 2036, will reduce the amount of stormwater flows pumped into WCA-3A through S-9 and seepage flows returned to WCA 3A through S-9A.

### **3.3.1. Recommended Water Quality Improvement Strategy**

The following water quality improvement measures are being implemented for the C-11 West Basin:

- Continue funding through Fiscal Year 2010 for the implementation of source controls;
- Continue implementation of source controls through regulatory programs (i.e., BMPs) to achieve water quality goals;
- Continue to assist Broward County and all stakeholders in the implementation of the Broward County C-11 West Basin Pollution Reduction Action Plan; and
- Rely on the CERP projects as the primary means of reducing total phosphorus loads discharged to WCA-3A from the C-11 West Basin. The CERP Master Implementation Schedule for the Broward County WPA project has been revised to 2012-2015, and for the purpose of this Long-Term Plan update, completion by approximately FY2016 is assumed.

No new measures are recommended for the C-11 West Basin at this time.

### **3.3.2. Estimated Costs**

The January 2007 revision to the Long-Term Plan extended the funding for the Broward County Source Controls Project, including the C-11 West Basin, through FY 2010. A total of \$230,000 has been allocated for the NSID, North New River Canal (NNRC), and C-11 West basins for FY 2009 and FY 2010. These funds will be used primarily to continue implementation, in

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partnership with Broward County, of public outreach and education activities in said basins. These funds will be used primarily to continue implementation, in partnership with Broward County, of public outreach and education activities in said basins





### **3.4. L-28 Basin**

The L-28 Basin covers an area of about 72,000 acres (113 square miles). It is located west of Water Conservation Area (WCA) 3A and south of the Everglades Agricultural Area (EAA) at the northeast corner of the Big Cypress National Preserve in Broward, Hendry and Collier Counties. Two of the largest landowners within this basin are the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida. A small portion of the Big Cypress National Preserve is also located in the basin. The L-28 Basin is entirely occupied by four landowners. The C-139 Annex (approximately 25% of the basin) is comprised of the U.S. Sugar Corporation's Southern Division Ranch, Unit 1. The Seminole Tribe's Big Cypress Reservation occupies approximately 34% of the basin. Approximately 28% of the basin is situated in the Miccosukee Indian Reservation. The remaining 13% of the basin is within the Big Cypress National Preserve.

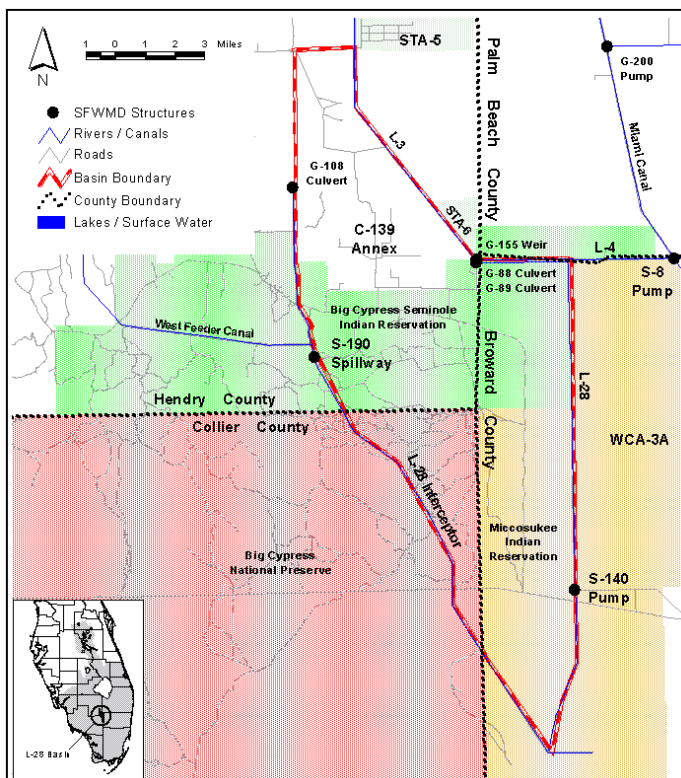
The surface water management system in the L-28 Basin provides drainage and flood protection in addition to providing water to WCA-3A when necessary for water supply purposes. The L-28 Borrow Canal is the primary drainage canal, running north/south for a distance of approximately 10 miles along the eastern border of the basin. The L-28 Borrow Canal conveys stormwater runoff to the S-140 pump station which discharges it directly into WCA-3A. The S-140 pump station has three pumps with a combined pumping capacity of 1,300 cubic feet per second (cfs). The nominal capacity of S-140 was established to provide an average removal rate from the L-28 Basin of 7/16" per day. The L-28 Interceptor Canal, which borders the basin on the southwest, conveys discharges from the S-190 Structure (Feeder Canal Basin) to WCA-3A and is separated from the L-28 Basin by a levee. Wetland and agricultural land uses account for approximately 96 percent of the basin area. A map of the L-28 Basin is presented in **Figure 3-5**.

Five programs are being implemented to improve the water quality entering the Everglades Protection Area from the L-28 Basin. These programs are described below.



**Figure 3-5. L-28 Basin Map.**

(Source: Brown & Caldwell 2002)



**Demonstration Project.** At the request of the Miccosukee Tribe, the District is funding a demonstration project that will result in reduced drainage of the triangle area of the L-28 Canal Basin south of I-75. The project is scheduled for construction by the end of 2010; however, as of the time of developing this Draft document, no estimates of the influence on flows and loads leaving the L-28 Canal Basin are available.

**Diversion of Flows from the C-139 Annex.** The C-139 Annex presently drains to the L-28 Borrow Canal at the north line of the Big Cypress Seminole Indian Reservation. In December 2006, the infrastructure to divert all runoff from the C-139 Annex to STA-6 was completed but it is not expected to be operational until District staff finalizes regulatory compliance requirements



with the landowner to maintain phosphorus discharges to no greater than historic levels. Once the operation permit is issued, runoff from that area will be diverted to STA-6. A TP load compliance measure must be developed and incorporated into the Environmental Resource Permit (ERP) for the C-139 Annex to assure that discharges from the C-139 Annex do not exceed historic levels. Upon diversion, the total area of the L-28 Basin will be effectively reduced to approximately 53,000 acres.

**Miccosukee Water Management Plan.** The Miccosukee WMP is a CERP Project to construct a managed wetland on the Miccosukee Tribe's 76,800-acre reservation in western Broward County. The Miccosukee Tribe is the local sponsor for this CERP Project. The project will convert 900 acres of pastureland on the reservation into wetland retention and detention areas. The project will provide water storage capacity as well as water quality enhancement for water that will be discharged to WCA 3A through the S-140 pump station. This project is being designed to accommodate flows and loads from reservation lands only. Completion of improvements is currently planned after 2015 (CERP Band 3, 2015-2020). Funding for this CERP project has not yet been authorized. The 2003 Long-Term Plan recommended the accelerated completion (by 2010) of the Miccosukee Water Management Plan project.

**Seminole Reservation Improvements.** The Long-Term Plan also relies on the Seminole Tribe Big Cypress Reservation Water Conservation Plan to be implemented under the Natural Resources Conservation Service (NRCS) PL-83-566 Small Watershed Project Program. The PL-83-566 Eastern Basins Overall Watershed Plan Project plan proposes construction of 3,835 acres of retention areas designed to improve water quality for flows from the Seminole Reservation lands only. The basic nature of the overall plan on the Big Cypress Reservation was originally defined in a February 6, 1995 *Conceptual Water Conservation System Design*, prepared for the Seminole Tribe of Florida by AMS Engineering and Environmental of Punta Gorda, Florida. Plans call for the system to be divided into three sub-systems: WRA-5, WRA-6, and WRA-7. WRA-5 and WRA-6 discharge to the south native land. WRA-7 discharges to the L-28 Canal. Those areas (WRA-5, WRA-6 and WRA-7) were intended to treat an average annual volume of 32,418 acre-feet per year, consisting of runoff from a total contributing area of 13,957 acres. The



total phosphorus load in those inflows was estimated to average 12.327 tons (11,183 kilograms) per year, equivalent to a flow-weighted mean TP concentration of 280 ppb. However, that estimated TP inflow load was based on generalized estimates of runoff concentration by land use; the primary land use in lands tributary to these three WRAs is improved pasture, which was assigned a mean TP concentration in runoff of 300 ppb. The total area identified for the three WRAs was 3,835 acres (with 3,257 in the largest, WRA-7). These WRAs were not included in either Phase I or Phase II of the Critical Restoration Project. Funding for these WRAs has been obtained through the NRCS PL 83-566 Small Watershed Project Program. The 2003 Long-Term Plan recommended modification of Seminole Water Conservation Plan project to convert WRA-7 to an STA by 2010 at a cost of approximately \$20 million. No plans or funding has been authorized to implement this Long-Term Plan recommendation.

**Comprehensive Everglades Restoration Plan.** CERP Component RR4 includes expanding the S-140 pump station from a capacity of 1,300 cfs to a capacity of 2,000 cfs and relocating it approximately 8 miles to the south. The purpose of the project is to improve hydropattern in the western area of WCA 3A and to provide increased water supply to the area. This project also complements the Big Cypress/L-28 Interceptor Modifications CERP Project that will degrade the west berm of the L-28 Interceptor Canal to allow for the sheet flow of water from the Feeder Canal Basin into the Big Cypress National Preserve south of the Big Cypress Reservation. The Big Cypress/L-28 Interceptor Modifications CERP Project will eliminate a point-source discharge into WCA 3A. Therefore, CERP Component RR4 will offset the water supply to the western section of WCA 3A that will be lost when the west berm of the L-28 Interceptor Canal is degraded. An estimated 285,000 acre-feet per year of additional water from STA-3/4 will be conveyed to the new S-140 pump station. The planning process for determination of the manner in which this flow will be conveyed to the new S-140 pump station is not complete.

The District initiated coordination with the tribes, the USACE and the federal interest in the Big Cypress National Preserve in June 2003. Additional coordination is still necessary to integrate the various projects in the basin. The District, through its coordination with the Seminole and Miccosukee tribes, continues to pursue the implementation of the 2003 Long-Term Plan



recommendations for the Seminole WCP and Miccosukee WMP projects. As of July 2007, the scope of the Seminole WCP project has not been modified to convert WRA-7 to an STA. No plans or funding has been authorized to implement this Long-Term Plan recommendation. Also, as of July 2007, funding for the Miccosukee WMP CERP Project has not been authorized. Completion of the project is currently planned after 2015 (CERP Band 3, 2015-2020). Therefore, the 2003 Long-Term Plan recommendation to accelerate completion of the project by 2010 is unlikely to be implemented.

**Final selection of the specific plan of improvement in the L-28 Basin and determination of the implementation schedule will be accomplished through the CERP and NRCS planning processes.** In the L-28 Basin, the two tribes are expected to fulfill the role of local sponsor to the federal initiatives. Implementation of the current water quality improvement strategy will require close coordination with the appropriate Tribal, state and federal agencies. The most immediate focus should be to either confirm or modify the remaining steps:

1. **Conduct a watershed assessment.** The watershed assessment and related planning efforts are considered critical to the proper development of both Tribal projects. Development of the initial conceptual designs of the two Tribal STAs presented in Appendix C required a number of key assumptions, approximations and generalizations. It is the intent that the watershed assessment and related planning work further define and more fully document the requirements for these projects and their projected performance. The watershed assessment should take full advantage of all available water quality data that can be obtained from the two Tribes, and should consider in detail the influence of seepage from WCA-3A to the L-28 Borrow Canal on both measured and simulated discharges from Pumping Station S-140. In addition, the assessment should consider the influence of the Tribes' water conservation plans and intended Reservation operations on the overall water and phosphorus load balance in the L-28 Basin.
2. **Complete all necessary planning, engineering and design for the two tribal STAs.** All necessary lands should be dedicated or acquired; and



3. **Complete construction of both STAs.** Following completion of construction, it is anticipated that an additional period of approximately two years would be required for full maturation and stabilization of the biological treatment process.

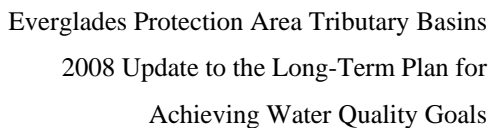
#### **3.4.1. Recommended Water Quality Improvement Strategy**

As discussed above, the following water quality improvement measures are being implemented for the L-28 Basin:

- Diversion of C-139 Annex discharges to the L-3 drainage system.
- L-28 Canal Demonstration Project
- Seminole Tribe Big Cypress Basin Reservation Water Conservation Plan
- Miccosukee Water Management Plan
- CERP Component RR4

No additional strategies are proposed for the L-28 Basin.





The Feeder Canal Basin covers an area of about 72,000 acres (113 square miles) in southeastern Hendry County. It is located west of Water Conservation Area (WCA) 3A, southwest of the Everglades Agricultural Area (EAA), and north of the Big Cypress National Preserve. A portion of the Big Cypress Seminole Indian Reservation (approximately 13,500 acres) is located in the southeast corner of the basin. A map of the Feeder Canal Basin is presented in **Figure 3-6**.

Feeder Canal Basin

McDaniel Property

Big Cypress Seminole Indian Reservation

WWER

S&M CANAL

DEERFENCE CANAL

NORTH FEEDER CANAL

WEST FEEDER CANAL

G100

PG17A

S100

HENDRY COUNTY

COLLIER COUNTY

0 0.5 1 Miles

Feeder Canal Basin

2004-2005 DOQQ Natural Color 1-Meter

Flow-weighted mean TP concentrations for this basin (measured at S-190) over the period encompassing WY1998-WY2008 averaged 117 ppb. It is expected that the TP levels will be a function of the flow volumes and concentration reductions achieved by the various elements discussed below, all of which assume a long-term flow-weighted mean TP concentration of 50 ppb.



**McDaniel Ranch.** McDaniel Ranch is a large area of privately owned land (34 sections) in the northeastern portion of the basin that is a primary contributor of runoff to the North Feeder Canal (through the structures PC-17A and G-108). Annual flow-weighted mean TP concentrations in runoff from this area have averaged 160 ppb over the period WY2002-WY2006. Original McDaniel Ranch owners executed a landowners' agreement with the Seminole Tribe that requires stormwater discharges at structures PC-17A and G-108 to meet a 50 ppb FWM TP concentration target through a combination of BMP implementation and construction of a stormwater management system. ERP No. 26-00623-P, issued on July 12, 2006, required that the construction of the remaining stormwater system (McDaniel Ranch project) be completed by June 2007. The 2003 Long-Term Plan assumed completion of the McDaniel Ranch project by December 2006; however, because of delays, Revision 6 of the Long Term Plan (dated January 3, 2007) reflected an anticipated completion date of June 2007. As of June 2007, system certification for operation was pending. A portion (3,256.8 acres) of the original McDaniel Ranch area has been sold and the District has been working with the new owner to implement BMPs. The area continues to be subject to the 50 ppb FWM TP concentration target at structures PC-17A and G-108 for a performance measure.

**Seminole Tribe Big Cypress Reservation Water Conservation Plan.** The Seminole Tribe Big Cypress Reservation Water Conservation Plan (WCP) is a Federal Critical Restoration Project being funded by the USACE under Section 528 of the Water Resources Development Act (WRDA) of 1996. Phase I of the WCP, completed 2003, includes canal improvements designed to ensure delivery of water supply from the G-409 pump station to the reservation. Phase II of the WCP, currently scheduled for completion by late 2008, involves improvements designed to improve water quality, restore wetland hydrology, increase water storage capacity and enhance flood protection within the reservation. Phase II improvements include four Water Resource Areas (WRAs), WRAs 1, 2, 3, and 4, and related water storage facilities in the Feeder Canal Basin to provide detention of stormwater for various flood protection and ecological purposes, and to provide treatment of runoff to be discharged from the Reservation. Although the District has not received any estimate of annual flows or TP levels anticipated as a result of the Seminole WCP, it is assumed that following completion of the WCP, discharges from the Big Cypress





Seminole Indian Reservation will comply with the 50 ppb TP concentration limit included in the USACE permit for the project. Design of Phase II improvements have been completed by the Jacksonville District, USACE. Construction completion of WRAs 1 and 4 is scheduled for November 2007 and May 2007, respectively. Construction completion of WRAs 2 and 3 is scheduled by late 2008. The 2003 Long-Term Plan assumed completion of the Seminole WCP by December 2006; however, Revision 6 of the Long Term Plan (dated January 3, 2007) amended this completion date to late 2008.

The basic nature of the overall plan on the Big Cypress Reservation was originally defined in a February 6, 1995, *Conceptual Water Conservation System Design*, prepared for the Seminole Tribe of Florida by AMS Engineering and Environmental of Punta Gorda, Florida. That document suggests the development of four WRAs in that part of the Big Cypress Reservation lying in the Feeder Canal Basin. Those areas (WRA-1, WRA-2, WRA-3 and WRA-4) were intended to treat an average annual volume of 19,126 acre-feet per year, consisting of runoff from a total contributing area of 7,998 acres. The total phosphorus load in those inflows was estimated to average 3.936 tons (3.57 tons) per year, equivalent to a flow-weighted mean TP concentration of 151 ppb. However, that estimated TP inflow load was based on generalized estimates of runoff concentration by land use. The total area identified for the four WRAs was 1,291 acres.

The current planning for the Phase II improvements includes the construction of three inverted siphons to carry discharges from the three most southerly WRAs beneath the West Feeder Canal, discharging to forested wetland systems on the Reservation immediately south of the West Feeder Canal. Those discharges will then be carried south across that part of the Reservation lying south of the West Feeder Canal approximately 2.5 miles to the Big Cypress National Preserve.

**Big Cypress/L-28 Interceptor Modifications CERP Project.** The Big Cypress/L-28 Interceptor Modifications CERP Project is currently planned to be completed after 2020 (CERP Band 4, 2020-2025) and is intended to work in conjunction with the Seminole Tribe's WCP. As currently planned, this project would include three primary components: (1) degradation of berms along the L-28 Interceptor Canal to allow for the sheet flow of water into the Big Cypress



National Preserve south of the Big Cypress Reservation, (2) conversion of the S-190 Structure from a gated spillway to a pump station, and (3) construction of two STAs to meet applicable water quality standards in downstream receiving water bodies including WCA 3A. The Big Cypress/L-28 Interceptor CERP project will eliminate the point-source discharges into WCA-3A.

A basic assumption incorporated in the water quality improvement strategy recommended in the 2003 Long-Term Plan was that discharges to the EPA achieve compliance with the phosphorus water quality standard. That assumption stemmed from the observation that, in advance of the completion of the Big Cypress/L-28 Interceptor Modifications CERP Project, discharges from the Feeder Canal Basin would continue to be directed to WCA-3A as a point-source discharge down the L-28 Interceptor Canal. Upon completion of the Big Cypress/L-28 Interceptor Modifications CERP Project, those point-source discharges would be eliminated, and all Feeder Canal Basin discharges would be distributed to the Seminole Reservation native areas and the Big Cypress National Preserve downstream (south) of the West Feeder Canal. Those discharges would then be carried in the natural system in those areas (undisturbed cypress domes and wet prairie sloughs), eventually discharging to WCA-3A in the “Gap” area (an approximate seven-mile long uncontrolled connection between the L-28 Tieback Basin, which consists primarily of the Big Cypress National Preserve, and WCA-3A).

The basic strategy for the Feeder Canal Basin recommended in the 2003 Long-Term Plan was also based on the principal assumption that long-term water quality standards for discharges to the undisturbed cypress domes and wet prairie sloughs downstream of the West Feeder Canal will not be as restrictive as those for discharges to the EPA. The primary basis for this assumption was recognition that the surface water quality standard for the Big Cypress Seminole Indian Reservation is a narrative criterion which states that in no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna. The USACE permit for the Seminole Tribe WCP does not *require* that discharges from the project meet a long-term flow weighted mean TP concentration of 50 ppb. The WCP, which is designed to accommodate flows and loads from reservation lands only, has a project *goal* to achieve discharges of 50 ppb.



The water quality improvement strategy for the Feeder Canal Basin relies on completion of the Critical Restoration Project on the Big Cypress Seminole Indian Reservation, and the Big Cypress/L-28 Interceptor Canal Modifications CERP Project. The District initiated coordination with the Seminole Tribe, the USACE and the federal interest in the Big Cypress National Preserve in June 2003. Additional coordination is still necessary to integrate the various projects in the basin. Final selection of the specific plan of improvement in the Feeder Canal Basin and determination of the implementation schedule will be accomplished through the CERP planning process. The Seminole Tribe is expected to fulfill the role of local sponsor to the federal initiative.

As recommended by the 2003 Long-Term Plan, the District evaluated the potential acceleration of the Big Cypress/L-28 Interceptor Modification CERP Project. This CERP project, scheduled for completion after 2020 (CERP Band 4, 2020-2025), will eliminate the point-source discharges into WCA-3A. It was determined that it was not possible to accelerate and complete the project by 2009 due to schedule and funding constraints. The District also met with stakeholders in early 2004 to discuss the benefits of an interim pump at S-190, with an associated downstream plug to encourage sheetflow into Big Cypress National Preserve. However, after further investigation, it was determined the interim project was not feasible, primarily because of the Preserve's concerns over the level of TP concentrations. The District continues to pursue the acceleration of the Big Cypress/L-28 Interceptor Modification CERP Project, so that it might be completed prior to the currently scheduled date after 2020.

**Phosphorus Source Controls.** As recommended by the 2003 Long-Term Plan, the District implemented a BMP grant program, for implementation of source controls, or BMPs, for the basin in partnership with NRCS, the Florida Department of Agriculture and Consumer Services (FDACS), and the Hendry Soil and Water Conservation District. Approximately \$500,000 in District funding was awarded to projects within the Feeder Canal Basin. Revisions 6 and 10 of the Long Term Plan (dated January 3 and December 10, 2007, respectively) recommended additional funding in FY 2007 through FY 2010 for the continued implementation of source controls. Because of the increased trends in phosphorus in discharges, the District initiated a

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regional study that incorporates an evaluation of water quality and hydrology. The study evaluates the sources of TP within the basin to understand the relationship between TP load and concentrations with rainfall and runoff conditions with the objective of optimizing the source control programs in this basin. Based on the results, the District will perform an expanded regional feasibility study of potential water quality improvement projects and programs for the surrounding area.

**Integrated Permit Compliance Initiative.** As recommended by Revision 6 of the Long Term Plan (dated January 3, 2007), in early 2007 the District initiated an integrated regulatory compliance program applicable to all landowners throughout the basin. This program includes ensuring compliance with existing permits including ERP, Surface Water Management (SWM), and Consumptive Water Use (CUP). These permits have the potential to affect water quality and quantity and compliance with permit conditions is essential for a holistic approach to reducing phosphorus loads discharging from the basin. This initiative also includes requirements to implement BMPs to reduce phosphorus in discharges.

#### ***3.5.1. Recommended Water Quality Improvement Strategy***

As discussed above, the following water quality improvement measures are being implemented for the Feeder Canal Basin:

- Monitoring compliance with the terms of the landowners' agreement between McDaniel Ranch and the Seminole Tribe, which requires the continued implementation of BMPs and compliance with the ERP for operation and maintenance of the stormwater management system on the McDaniel Ranch property;
- Continue to require compliance with the performance target of 50 ppb TP concentration in stormwater discharges based on data collected from PC-17A and G-108;



- Continue to enforce requirements of ERPs, Surface Water Management permits and Consumptive Use permits, and seek BMP implementation through ERP conditions, for all properties within the Feeder Canal Basin to ensure that the TP water quality target of 50 ppb for the Feeder Canal Basin is met;
- Implementation of Seminole WCP by late 2008; and
- Implementation of Big Cypress/L-28 Interceptor Modification CERP Project, including its two planned STA within the basin (CERP Project completion assumed by 2020-2025, however acceleration to an earlier date will continue to be sought);

In addition to the existing measures described above the following new initiatives are recommended:

- **Initiate Rulemaking.** Because TP concentration in discharges from the Feeder Canal Basin are consistently above the 50 ppb concentration level, this update to the Long-Term Plan recommends the District conduct rulemaking in 2009 to mandate Feeder Canal Basin landowners to implement BMPs under a regulatory phosphorus source control program. Rulemaking will ensure implementation of BMPs across all properties within the Feeder Canal Basin is planned by 2010. The performance measure will continue to require that the landowners collectively achieve a flow-weighted mean TP concentration of 50 ppb at the S-190 structure, or at structures representative of upstream sub-basins. Compliance with the 50 ppb performance target for Feeder Canal Basin landowners located in the areas within the Feeder Canal Basin west of the westernmost boundaries of the historic McDaniel Ranch property and the Big Cypress Seminole Indian Reservation (a.k.a. West Feeder Canal sub-basin) will be based on the WVEIR structure (West Weir) monitoring results. Compliance with the 50 ppb performance target for the property historically known as McDaniel Ranch will continue to be based on the G-108 and PC-17A structure monitoring results. For compliance measurement purposes, any potential sheet flow between the McDaniel Ranch property and the West Feeder Canal sub-basins



will be considered to have a negligible effect on water quality at the downstream structures (WWEIR, G- 108 and PC-17A) unless data can show otherwise.

- Provide additional funding through FY 2016 for the continued source control program development, implementation, and optimization activities (perform necessary modeling associated with rulemaking, establish and optimize the compliance water quality monitoring network, and continue implementation of a mandatory source control program).

### **3.5.2. Estimated Costs**

It is recommended that the level of funding for source control programs in the Feeder Canal Basin be increased to \$150,000 per year for FY 2011 through FY 2016 to: 1) conduct rulemaking for implementation of mandatory source controls specific to Feeder Canal Basin; 2) perform necessary compliance methodology development and modeling associated with proposed rulemaking; 3) optimize the water quality monitoring network used for performance measurement, and 4) continue implementation and adaptive management of the source control program based on water quality monitoring results.

## **3.6. Summary Opinion of Cost and Expenditures**

A summary opinion of the total estimated expenditures for the recommended water quality improvement strategies in the Non-ECP Basins for FY 2009 through FY 2016 (in FY 2008 dollars) is presented in Table 3-2. When the Long-Term Plan was developed in 2003, the Everglades Source Controls Program required by the 1994 Everglades Forever Act had already been underway for several years. Therefore, the Long-Term Plan recommendation for source controls funding included some limited additional funding to augment the Source Controls Program that was already underway. In order to more accurately represent the overall Everglades Sources Controls program being implemented in support of the Long-Term Plan, the District



recommended that those costs be identified as part of the Long-Term Plan (Revision 10 to the Long-Term Plan). The revision allows the District to track costs for the Everglades Source Controls Programs and the supplemental source controls projects activities under a unified Long-Term Plan accounting and reporting code.

**Table 3-2. Projected Long-Term Plan Expenditures FY2009-2016, Non-ECP Basins.**

*(Note: the following draft table is being reviewed and may be revised)*

Fiscal Year	Projected Expenditure by Basin (FY 2006 Dollars)		Total Fiscal Year Expenditure
	Broward County Basins NSID, NNRC, C-11W	Feeder Canal Basin	
2009	\$130,000	\$200,000	\$330,000
2010	\$100,000	\$150,000	\$250,000
2011		\$150,000	\$150,000
2012		\$150,000	\$150,000
2013		\$150,000	\$150,000
2014		\$150,000	\$150,000
2015		\$150,000	\$150,000
2016		\$150,000	\$150,000
<b>Total</b>	<b>\$230,000</b>	<b>\$1,250,000</b>	<b>\$1,480,000</b>
Note: All projected expenditures are in FY 2008 dollars			

The above projected expenditures exclude those for completion of CERP projects in the Non-ECP basins on which the water quality improvement strategies in this Part 3 are based. Should one or more of those projects eventually not proceed to completion as envisioned herein, the projected expenditures for attaining water quality standards in discharges from the Non-ECP basins would increase dramatically.



### **3.7. References**

Brown & Caldwell. 2002. Basin Specific Feasibility Study for the Non-ECP Basins. Prepared for South Florida Water Management District.

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